Campus-Wide Information Systems

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Abstract

Purpose – The paper's purpose is to investigate the current status, problems and benefits of strategic information systems planning implementation in Malaysian public universities.

Design/methodology/approach – The study uses dual but mutually supportive strands of investigation, i.e. a questionnaire survey and interviews.

Findings – Malaysian public universities are aware of the importance of SISP. While only one university has implemented SISP, 15 others are either at the implementation or planning stage. These universities are suggested to devote more time, efforts, and resources to successfully implement the SISP initiative.

Originality/value – This is the first study to investigate SISP status and process in Malaysian public universities using a combination of quantitative and qualitative data.

Keywords Malaysia, Universities, Information systems, Project planning

Paper type Research paper

Introduction

Information technology (IT) has revolutionised business practices and plays a central part in business strategies. Enterprise-wide information systems, enabled by sophisticated technology, can help organisations adapt to the challenging business environment, providing new forms of customer services, new distribution channels and redefining organisational procedures and boundaries. To achieve this, organisations should have a strong and well-developed strategic information system plan (SISP). A SISP consists of a strategy for both information planning and management, including the use of functions and features of IT (Galliers *et al.*, 1995). With a proper strategic IT plan, organisations can use IT more competitively, identify new and higher payback IT applications, and better forecast IT resource requirements (Basu *et al.*, 2002). Similarly, SISP within tertiary educational institutions is important for the successful implementation of a campus-wide information system.

Realizing the importance of SISP, several researchers have proposed SISP models to guide business organisations (e.g. Smits and Van der Poel, 1996; Lederer and Salmela, 1996). Many studies have also revealed factors motivating and inhibiting SISP projects (e.g. Doherty *et al.*, 1999; Hackney and McBride, 2002). However, most of this research centered on business organisations. Very little is known about the status of the SISP process in the context of higher learning institutions. Therefore, this study attempts to fill this gap by exploring the status of SISP implementation in the specific context of public universities in Malaysia. Specifically, this study attempts to answer the following questions:

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- What is the current status of SISP in Malaysian public universities?
- What are the benefits gained by Malaysian public universities from implementing SISP?
- What are the problems faced by Malaysian public universities in implementing SISP?

It is hoped that the findings from this study will increase the awareness and understanding of SISP and its implementation among public universities in Malaysia.

Previous studies

This section briefly reviews literature relating to IT developments and SISP initiatives in higher education.

IT in higher education

The role of IT has grown in importance over the last two decades. Rapid changes and developments in the IT domain have created new leaders in the market place, including the higher education sector. IT is now fundamental to the teaching, learning and research mission of modern universities (McRobbie and Palmer, 2001). Higher education institutions thus need to take up opportunities to adopt IT in their activities. Rowley *et al.* (1997) suggested that higher education institutions need to focus their attention on stimulating innovations in research, teaching and learning, and management through the aggressive use and application of IT.

McRobbie and Palmer (2001) reported that Indiana University had aggressively used IT in its four main areas of research and academia, teaching and learning, administrative support and telecommunications since the inception of its comprehensive SISP in 1998. Similar efforts were made at the University of California at Berkeley (2006). However, IT developments among institutions of higher learning in East Asian countries are still behind those of developed countries (e.g. Ismail *et al.*, 2006; Vicziany and Puteh, 2004; Titthasiri, 2000; Semiawan and Middleton, 1999). Wiggins (1995, p. 509) suggested that a campus-wide information system is "a system that brings together online documents and ways to access campus computing resources under a single comprehensive umbrella". However, Ismail *et al.* (2006) and Vicziany and Puteh (2004) found that campus information systems in universities and colleges in Malaysia were often established in an uncoordinated manner, reflecting interests in different areas, and resulting in issues of redundancy and inefficiency.

Malaysia, since the inception of Vision 2020 and Multimedia Super Corridor (MSC) in 1991 and 1996, respectively, has regarded new technologies as a critical factor in ensuring that Malaysian economic development will continue at the highest level (Juhary, 2005). Both policies placed a priority on Malaysia to create a new generation of knowledge workers. Ironically, Vicziany and Puteh (2004, p. 19) have argued that despite these efforts, "Malaysian government strategies have not placed much emphasis on education and the use of IT". Whatever the policy failures until now, Juhary (2005) argued that the emphasis on creating knowledge workers in Malaysia has created a general awareness on the potential of e-learning and web-based applications. Anecdotal evidence also shows that many universities in Malaysia have started to establish nascent IT policies, infrastructure and e-learning curriculum. More recently, the Ministry of Higher Education and all public universities have been

working together to produce a strategic IT plan for use by higher education institutions in Malaysia. The draft guideline, called the "KICTSP IPTA Strategic Plan", will also include a template to help university planners implement SISP.

SISP in higher education

The importance of SISP is not only subject to commercial business, but can be applied to the educational pedagogical system. Sabherwal (1999) suggested that comprehensive IT planning predicts greater success in academic institutions. IT can be applied to facilitate academic and administrative activities in educational institutions. Campus-wide information systems should integrate all information into a single platform to ensure that academic and administrative activities are managed smoothly. In the context of teaching and research, IT can facilitate the process of creating, sharing and diffusing information (Titthasiri, 2000).

Despite the importance of SISP, results from prior studies suggested that higher education institutions still lack comprehensive IT strategic plans. For example, Tellis (1997) and the University of California at Berkeley (2006) revealed that IT usage at two universities in the USA lacks comprehensive plans, especially regarding issues relating to IT governance, funding and structure. Titthasiri (2000) also revealed that despite great interest in using IT in both academic and administrative areas, most higher education institutions in Thailand lack understanding and experience of strategic IT planning, which limits the progress of IT developments in most institutions. To help planners in these institutions to develop SISP initiatives, Titthasiri (2000) proposed an IT strategic planning process and IT planning team organisational structure to be used as a guideline. Yaakub *et al.* (2005) found that only seven (15 percent) of 48 private universities and colleges in Malaysia that participated in the study had implemented SISP. Despite this low implementation rate, most of the institutions acknowledge the importance and benefits of SISP to their institutions. Semiawan and Middleton (1999) found that information system functions and performance at four Indonesian universities were influenced by SISP. The study also revealed that each of the institutions had established computer-based information systems, and currently use and value the IT system.

In order to support the use and application of IT in government agencies, the Malaysian Government, through the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), launched the Malaysian Public Sector Information and Communication Technology Strategic Plan in August 2003. The guideline is to help government agencies apply IT creatively in order to obtain competitive advantage and support business strategy, ensure that IT investments are cost-effective and benefits are measured against planned goals/budgets, control IT expenditures, protect existing IT investments, resolve conflicting demands for limited IT resources, obtain joint IT management and user commitment, and avoid *ad hoc* IT projects. The guideline adopts a four-stage approach that answers the why, what, how, and when questions for each activity of the formulation of an IT strategic plan. The guideline itself is not totally precise but it can accept changes according to business environment, unique situation or the special talents of teams' members. It has been used by many agencies including higher education institutions as the main guideline for SISP initiatives.

SISP benefits and problems

SISP can help organisations develop priorities for information systems development by ranking such systems in terms of their efficiency, effectiveness, and strategic value. In that manner, SISP helps organisations identify its portfolio of planned computer-based applications, which both align well with corporate strategy and can create an advantage over competitors (Doherty *et al.*, 1999). Despite its potential benefits, organisations are still facing numerous problems in implementing SISP. Lederer and Sethi (1988) highlighted the top nine problems of SISP implementation:

(1) difficulty in securing top management commitment;

(2) post-analysis is required after the study is completed (additional IT information required);

(3) no training plan for IT development;

(4) success is dependent on the IT leader;

(5) difficulty in finding a team leader who meets the proper criteria;

(6) lack of sufficient computer support;

(7) ignores plan implementation issues;

(8) no analysis of IT department strengths/weaknesses; and

(9) no analysis of technology environment.

Teo and Ang (2001) also revealed that failing to secure top management support is the most serious SISP problem. Yaakub *et al.* (2005) noted not having a clear-cut corporate plan to guide IT as the main problem faced by Malaysian private colleges and universities in implementing SISP.

Research methodology

This study focuses primarily on 17 Malaysian public universities. For this purpose, dual but mutually supportive strands of investigations were carried out. Initially, a mail questionnaire was undertaken. This provides a basis for examining the status of SISP implementation among the institutions. The questionnaire was divided into three sections. Section A of the questionnaire was designed to elicit background information on the institutions. Section B was designed to elicit the status of SISP implementation of the institutions. Section C was designed to investigate the perception of the respondents towards the importance of each of the SISP tasks outlined by MAMPU and also whether the tasks are followed or not by the respondents during the implementation process. The four-point scale used was: 1 = important and implement; 2 = important but not implement; 3 = not important but implement; 4 = not important and not implement. A series of interviews were then carried out with the Director of the Computer Center of each institution. This method provides details of the benefits and problems faced during the SISP implementation process and allows a richer appreciation of the process by which SISP emerges and develops in these institutions. Among the main questions asked include:

- How are IT decisions made and priorities set? By whom?
- How is funding allocated for IT spending?
- How are IT functions/services and staff currently organized?

Results

This study aims to explore the status of SISP implementation among public universities in Malaysia. Nearly half of the institutions were established more than 20 years ago, and so can be considered mature institutions. Twenty-nine percent of the institutions have been established for five years or less. Preliminary results show that only one (6 percent) of the 17 institutions has completed SISP implementation. Thirteen institutions are in the implementation stage, two institutions are still in the planning stage, while one institution has yet to decide its IT strategic plan.

The MAMPU SISP guideline consists of four implementation stages:

(1) analysis of business environment;

(2) analysis of IT environment;

(3) development of IT strategy; and

(4) development of implementation plan.

Each stage consists of several phases, which also comprise several tasks. The following sections present the survey results of the respondents' perception toward the importance and compliance of each task.

Analyses of business environment

This initial stage of SISP implementation focuses on the analyses of organisational main functions, business issues, opportunities and outcomes. Table I shows the frequency analysis of each task in stage 1. The results in Table I indicate that all respondents perceived tasks 1, 2, 3, 4, 5, 7, and 8 as being important to their SISP initiative. However, several respondents, despite acknowledging the importance of these tasks, decided not to implement them. Two respondents perceived task 6 (determining agency value chain) and task 9 (consolidate findings), as not being important. Interestingly, three of the four respondents still implement the tasks.

Criteria	1	2	3	4
Phase 1: Develop agency overview				
T1. Understand background of agency	15	–	–	–
T2. Understand agency vision and mission	15	–	–	–
Phase 2: Review of current business environment				
T3. Understand corporate strategy	15	–	–	–
T4. Review current issues and opportunities	12	3	–	–
T5. Develop first-cut vision of opportunities and directions	11	4	–	–
T6. Determine agency value-chain	9	4	1	1
Phase 3: Identify areas of potential strategic advantage				
T7. Understand current business trends	11	3	–	–
T8. Identify immediate IT implication	11	3	–	–
T9. Consolidate findings	7	5	2	–

Notes: 1 = important and implement; 2 = important but not implement; 3 = not important but implement; 4 = not important and not implement

Table I.
Analyses of business environment

Analyses of IT environment

The second stage of SISP implementation involves a series of assessment on the current IT environment based on four major groups:

(1) strategy;
(2) delivery;
(3) people; and
(4) technology.

The results in Table II show that all respondents perceived tasks 10, 11, 12, 13, 14, 15, and 18 in this stage as being important to their SISP initiative. Interestingly, more than half of the respondents, despite acknowledging the importance of task 16 (assess strategic impact), decided not to implement it. Only one respondent each perceived task 16 (assess strategic impact) and task 17 (consolidate findings) as not being important. Despite this, these two respondents still follow the tasks.

Development of IT strategy

The third stage of SISP implementation identifies IT opportunities to support the business strategy and design the target IT environment which include target applications, technology architecture and IT governance. During this stage, new applications that have strategic impacts on the current IT environment will be identified and their functionality will be defined. These new applications will then be prioritised according to the target environment.

The results in Table III show that almost all respondents perceived all 15 tasks in this stage 3 as being important for their SISP initiative. However, similar to stage 1 and stage 2, some respondents decided not to implement tasks that they perceived as important. On the other hand, some respondents do implement tasks that they perceived as not important. For example, one or two respondents perceived that task 23 (build target applications overview), task 24 (prioritise target applications), task 26 (identify technology trends), task 28 (determine technology requirements), task 29

Criteria	1	2	3	4
Phase 1: Perform IT assessment				
T10. Review current IT strategy, plans and budget	14	1	–	–
T11. Review high level current IT environment	12	3	–	–
T12. Assess organization and management	13	2	–	–
T13. Assess applications and data	14	1	–	–
T14. Assess technology infrastructure	14	1	–	–
T15. Assess service delivery	13	2	–	–
T16. Assess strategic impact	6	8	1	–
Phase 2: Recommend short term action				
T17. Consolidate findings	10	4	1	–
T18. Identify short term IT improvement projects	13	3	–	–

Table II.
Analyses of IT environment

Notes: 1 = important and implement; 2 = important but not implement; 3 = not important but implement; 4 = not important and not implement

Criteria	1	2	3	4
Phase 1: Identify IT opportunities				
T19. Identify major IT opportunities	10	5	–	–
T20. Determine the benefits of IT opportunities	11	4	–	–
T21. Determine risks of IT opportunities	10	5	–	–
Phase 2: Define target applications				
T22. Develop initial target applications	11	3	–	–
T23. Build target applications overview	8	6	1	–
T24. Prioritise target applications	7	7	1	–
T25. Confirm target application to management	11	4	–	–
Phase 3: Develop technology strategy				
T26. Identify technology trends	9	5	1	–
T27. Define principles for technology strategies	7	7	–	1
T28. Determine technology requirements	10	4	1	–
T29. Determine target technology architecture	8	5	2	–
T30. Formulate technology strategy	6	6	2	–
T31. Revisit IT organisation and management issues	10	3	1	–
T32. Identify IT service and skills required	11	3	–	–
T33. Develop IT governance framework	9	4	1	–

Notes: 1 = important and implement; 2 = important but not implement; 3 = not important but implement; 4 = not important and not implement

Table III.
Development of IT strategy

(determine target technology architecture), task 30 (formulate technology strategy), task 31 (revisit IT organisation and management issues) and task 33 (develop IT governance framework) as not important. Despite this, almost all of them follow the tasks.

Develop implementation plan

This final stage of SISP implementation defines the major projects that are required to implement and estimate the investment. Similar to tasks in stage 1, stage 2 and stage 3, almost all respondents perceived all four tasks in this stage 4 as being important for their SISP initiative (Table IV) even though some of them do not implement the tasks.

Criteria	1	2	3	4
Phase 1: Develop implementation roadmap				
T34. Develop and rank projects	12	2	1	–
T35. Prepare for transition strategy	10	3	1	1
T36. Formulate implementation strategy	10	4	1	–
Phase 2: Estimate financial implications				
T37. Estimate project costing	11	3	1	–

Notes: 1 = important and implement; 2 = important but not implement; 3 = not important but implement; 4 = not important and not implement

Table IV.
Develop implementation plan

Discussion

Using mail questionnaire and interviews, this study identifies the status of SISP implementation among public universities in Malaysia. Despite the fact that nearly half of the institutions were established more than two decades ago, only one (6 percent) institution has completed its SISP exercise. Thirteen (76 percent) institutions are in the implementation stage, whilst two (12 percent) other institutions are still in the planning stage. The fact that nearly one-third of these institutions were established less than five years ago may explain the high percentage (76 percent) of institutions that are still in the implementation stage. Compared to Vicziany and Puteh (2004) and Yaakub *et al.* (2005), the findings from this study suggest that public universities in Malaysia are beginning to acknowledge the importance of SISP and have taken the necessary steps to implement it. One (6 percent) respondent, despite acknowledging the importance of SISP to its institution, has yet to come up with a plan for SISP. No pressure from top management was the main reason for not implementing SISP.

The respondents were then asked to rate the importance of each of the 37 tasks outlined by the MAMPU guideline. Almost all respondents perceived the tasks as being important to their SISP initiatives. The respondents were also asked whether they implement each of the 37 tasks. Interestingly, despite acknowledging the importance of most of the tasks, some respondents, however, do not implement them. Respondents gave various reasons for not implementing the tasks (among others, lack of manpower and expertise, lack of commitment from the top management, lack of cooperation and collaboration between departments, and budget and time constraints). Some of the respondents also claimed that despite their importance, the tasks did not fit their environment. On the other hand, some respondents perceived some of the tasks as not being important but decided to implement them. There is no specific reason given by the respondents, but a few of them admitted that they just follow the guideline. The finding is somewhat surprising as the MAMPU guideline itself is not totally precise but can be adapted to unique business environments such as institutions of higher learning. The finding also implies a lack of SISP knowledge among respondents.

Information gathered from interviews with the Director of the Computer Center of these institutions is noteworthy. Almost all respondents agreed that MAMPU SISP is a very useful guideline. However, many of them also agreed that current structure of IT planning team at their institutions prohibit effective communication, and thus collaboration between departmental units which resulted in a lack of comprehensive and coordinated IT plans. For example, the respondent from university A claimed that:

> . . . [the] initiative for IT strategic plan at this university seems to be the sole responsibility of the Computer Center . . . but you know we at the Computer Center lack formally trained staff in managing IT strategic planning . . . they know little about management because they are IT people".

He further added:

> . . . we really need full cooperation not only from the top management but also support at the departmental and faculty level.

Interestingly, the respondent from university J said:

> … this is not nice to say but I think … most of the committee members don't really know much about IT … so I really think that we may need to rethink about this … like appointing someone with some IT know-how.

The respondent from university G even questioned the sincerity of its management in promoting the effective use and application of IT at his institution. He claimed that:

> … regarding budget for IT … first, the management allocated about RM6 million for our IT expenditures … by mid-year the allocation was cut down to RM2 million and you know … we finally end up with only RM2 million … so it kind of jeopardised everything that we have planned for … nothing much that we can do with that amount of money … and this thing happened almost every year, which can be frustrating.

The respondent from university D, on the other hand, claimed that:

> … we normally have no problem with the management to approve our IT projects, but when it comes to funding it always stuck somewhere … I don't know what happens really … there seems to be a lack of communication between the approving committee and the Bursar Department.

The respondent from newly established university M, however, claimed that:

> … I am quite lucky because I receive full management support … and so far money is not a problem … probably because M is a new university.

Respondents were asked about the benefits and problems of SISP. Among the most frequent benefits mentioned by the respondents are that SISP helps (can help) organisations develop priorities for information systems development, determine opportunities, align business strategies with IT strategies, increase user participation and involvement, and forecast and allocate resources. The most frequent problems cited by the respondents are lack of expertise, lack of user participation and involvement, and lack of time to ensure that all planning tasks and individual responsibilities are well understood. Other problems identified are a failure to get full support and commitment from top management, unclear corporate plans, failure to translate goals and strategies into action plans, and budget constraints. Interestingly, the respondent from university C noted that:

> … [The] MAMPU IT Strategic Plan, like many others, is a nice guideline but we also need a strong and well-coordinated IT planning team at the university level to make it happen … and this must be supported by a sound fiscal plan.

He further noted that:

> … we must also ensure that all these nice IT plans move in tandem with the university overall strategic plan.

Conclusions

Findings from this study suggest that current SISP status among public universities in Malaysia is in tandem with the calls for all government agencies to effectively implement SISP in their organisations. In the meantime, our impression of the public universities is that much still needs to be done to effectively integrate IT into administrative and learning approaches. The institutions need to devote more time, effort and resources to implementing SISP successfully. Participation and involvement

from top management are crucial for the successful implementation of SISP. The IT planning team needs to play a more active role by constantly reviewing SISP exercises. Most importantly, the SISP task force should not follow the MAMPU guideline as it is, but should customise it to fit their unique environment and the special talents of the team's members. The forthcoming and newly designed KICTSP-IPTA guideline suggests that things are about to change. It is hoped that the new blueprint will assist university planners in developing a more effective and uniform IT strategic plan for all Malaysian public universities. Finally, the findings of this study should stimulate SISP implementation not only among public universities but also in private colleges and universities, and encourage researchers to further examine the links between the status and success of SISP implementation and its influence factors.

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